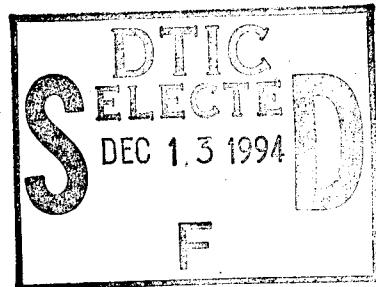


DOCUMENTED BRIEFING



RAND

Linking the Corporate Information Management (CIM) Initiative to Strategy-to-Tasks

William Schwabe, Leslie Lewis

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William Schwabe, Leslie Lewis

*Prepared for the
Office of the Assistant Secretary of Defense*

National Defense Research Institute

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PREFACE

This documented briefing completes work on a study of feasibility and concepts for linking the Strategy-to-Tasks framework and the DoD Corporate Information Management (CIM) initiative. The intended audience includes policymakers and policy analysts broadly concerned with future directions of the CIM initiative.

The work builds upon prior development of the Strategy-to-Tasks framework, originally done for the U.S. Air Force, and extensions sponsored by the U.S. Special Operations Command and by Commander, U.S. Forces, Korea.

This study was sponsored by the Director of Defense Information, Office of the Secretary of Defense. The research was conducted within the International Strategy and Defense Policy Center of RAND's National Defense Research Institute, a federally funded research and development center sponsored by the Office of the Secretary of Defense, the Joint Staff, and the defense agencies.

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SUMMARY

This documented briefing presents results of an analysis of how DoD's Corporate Information Management (CIM) initiative might be linked conceptually to the Strategy-to-Tasks (STT) framework, which RAND has been developing over the past few years.

CIM is a DoD program whose primary objective is business improvement, through means such as development of standardized or shared data systems. We see CIM as a functionally oriented business case-analysis methodology supporting continual process modernization—the new way of doing business within DoD.

This study is motivated by an appreciation that CIM's "business" perspective is not necessarily inconsistent with STT's "military" one, and there may be synergism in combining elements of the planning, representation, and evaluation techniques of each. The study's sponsor requested the analysis as a means to evaluate how new business practices being applied by the Clinton administration might be applied to DoD management.

This briefing has a fourfold purpose: (1) to note demands on DoD from a changing operating environment, (2) to review features of CIM and STT, (3) to understand how they might be linked conceptually, and (4) to recommend future applications of the CIM and STT concepts.

Our conclusions are that CIM concepts and STT are complementary, both being consistent with current DoD streamlining initiatives. They can provide needed discipline for resource decisionmaking, defining continuous (unbroken) thread relationships from national security strategy to budgeted resources.

CIM and STT strengthen the fiscally constrained planning function in the Planning, Programming, and Budgeting System (PPBS). They give planners needed tools to link operational (warfighting) requirements to support issues, to link operational military considerations to good business practices, and to make analysis behind resource trade-offs replicable.

ACKNOWLEDGMENTS

The authors would like to thank RAND colleagues C. Robert Roll and John Schrader for their contributions to this work. John Dumond reviewed earlier drafts, helping to make development of the concepts easier to follow.

**Linking
Corporate Information Management (CIM)
and
Strategy-to-Tasks (STT)**

1. INTRODUCTION

This documented briefing presents the results of an analysis of how selected concepts developed in the Department of Defense (DoD) Corporate Information Management (CIM) initiative might be linked to the RAND Strategy-to-Tasks (STT) framework.

This introduction gives brief background information on CIM and STT, as well as the purpose of the briefing.

Section 2 of the briefing comments on the evolving environment in which DoD operates—in particular, the increasing demands on planning, programming, and budgeting to support operational objectives and strategies.

Sections 3 and 4, respectively, describe CIM and STT, principally in terms of how they aid planning, representation and analysis of activities and elements, and evaluation of such.

Section 5 discusses how CIM and STT concepts might be linked. It illustrates use of the linked or combined concepts at the CINC level.

Section 6 covers some of the issues involved in implementing linked CIM and STT concepts.

Section 7 gives conclusions of the study and offers some recommendations.

Outline

- 1. Introduction**
- 2. DoD's Evolving Operating Environment**
- 3. Corporate Information Management (CIM)**
- 4. Strategy-to-Tasks (STT)**
- 5. Linking CIM and STT**
- 6. Implementation Issues**
- 7. Conclusions and Recommendations**

Background

CIM aims to improve management of the DoD through the increasingly important element of information management, viewed top-down from the "corporate" level. CIM is motivated, in part, by recognition that, below the corporate level, operating units often "do their thing" in ways that do not necessarily maximize overall, DoD-wide effectiveness or efficiency. In many cases, proprietary or redundant databases and information systems exist that cannot be justified from a corporate-wide or broad national mission perspective. To improve defense management, CIM brings to bear (1) a planning process, (2) analytic representation techniques, and (3) disciplined evaluation. It also provides program funding.

Similarly, STT aims to improve DoD effectiveness and efficiency through a planning process, analytic representation techniques, and disciplined evaluation. While CIM views DoD from a top-down business perspective, with the structure of information management and its processes as key to DoD success, STT views DoD from a more traditional military perspective, in which planning is top-down, but evaluation is bottom-up.

This study, linking CIM and STT, is motivated by an appreciation that CIM's "business" perspective is not necessarily inconsistent with STT's "military" one, and there may, in fact, be synergism in combining elements of the planning, representation, and evaluation techniques of each.

Issues

Why is it important to define linkages between STT and CIM?

How might STT be linked to CIM?

How might the application of CIM enhance current DoD planning activities?

- **New strategy**
- **Budget reduction**
- **Bottom-Up Review**
- **Streamlining and consolidating functions**
- **Joint warfighting capabilities**
- **etc.**

Issues

The sponsor of this study requested the analysis as a means to evaluate how new business practices being applied by the Clinton administration might be applied to DoD. Could they be applicable? The sponsor concluded that CIM and STT might be a good test case.

In conducting this research, we were concerned about several issues related to CIM. CIM might benefit from its extension from business functions to military or warfighting operations. STT might benefit through its further extension from strategic and tactical operations to business operations. At issue is whether these extensions might better be done independently or whether something better could be achieved by linking CIM and STT. If so, how might this be done? This is an active time for changes in DoD through a number of ongoing planning and budgeting activities. New strategy is being sought to replace Cold War strategies of containment and deterrence. Budget reductions are expected. The Defense Bottom-Up Review¹ was a fast-paced analysis to support FY-94 budgeting. Efforts are under way to streamline and consolidate functions, to improve joint warfighting capabilities, and to ensure that quality advantages evidenced in Operation Desert Storm will be maintained.

¹Les Aspin, *Report on the Bottom-Up Review (BUR)*, Department of Defense, Washington, D.C., 1993.

Purpose of Briefing

- **Note demands of a changing DoD environment.**
- **Review CIM and STT.**
- **Describe CIM and STT conceptual linkages.**
- **Recommend future applications.**

Purpose

The purpose of this briefing is to

- (1) Motivate the study by reviewing the demands of a changing DoD operating environment;
- (2) Review selected features of CIM and STT, as necessary, to understand how they might be linked conceptually;
- (3) Show how concepts from CIM and STT might usefully be linked; and
- (4) Recommend future applications of CIM and STT concepts.

Demands Being Placed on DoD

Analyses must consider all related factors

- **New environment for PPBS**
 - Shift in justification from threats to capabilities
 - Economic requirement to downsize forces
 - Military requirement to remain effective
- **New consensus on defense must be built**
 - Reconsideration of total force required
 - Reformulation and structuring of issues
- **New demands for credible analysis**
 - Reexamination of traditional assumptions
 - Inclusion of quantitative and qualitative, structured and unstructured factors
 - Decisionmaking based on costs, effectiveness, and impacts on competitiveness, unemployment, the environment, etc.

Implication: Need to develop a well-regarded and sound decisionmaking process understood by all participants.

2. THE DOD ENVIRONMENT

Demands on DoD Decisionmaking

DoD has faced a new environment since 1989, when the communist world began to unravel. Threats are no longer as apparent or so readily accepted as justification for our defense posture. Instead, decisions are being made on the basis of capabilities, costs, and benefits. This requires analysis and greater quantification of options and choices, which must somehow allow for explicit insertion of sound military (and other) judgment.

Defense officials know the public's concerns about reducing deficits, and they know better than the general public the dangers of being caught unprepared and the unacceptability of responding to reduced budgets by "doing business as usual," which could result in a "hollow force."

Playing in this new environment requires strong analytic capabilities. Dialogues and debates will contain much unstructured data, and the demands for credible analysis—to make sense of all this—will increase. Decisions must be responsive to multiple, legitimate concerns, including costs, political realities, and effectiveness—not just narrowly confined to countering threats.

The Discipline That Is Required

- **Each demander of resources must specify objectives clearly and rationally.**
- **Each objective must be related in a continuous thread to the tasks, capabilities, forces, programs, and resources needed to achieve it.**
- **Each task must be operationalized by an end-to-end concept of the capabilities needed to perform it.**
- **Dependence of capabilities on program decisions must be identified to allow trade-offs.**

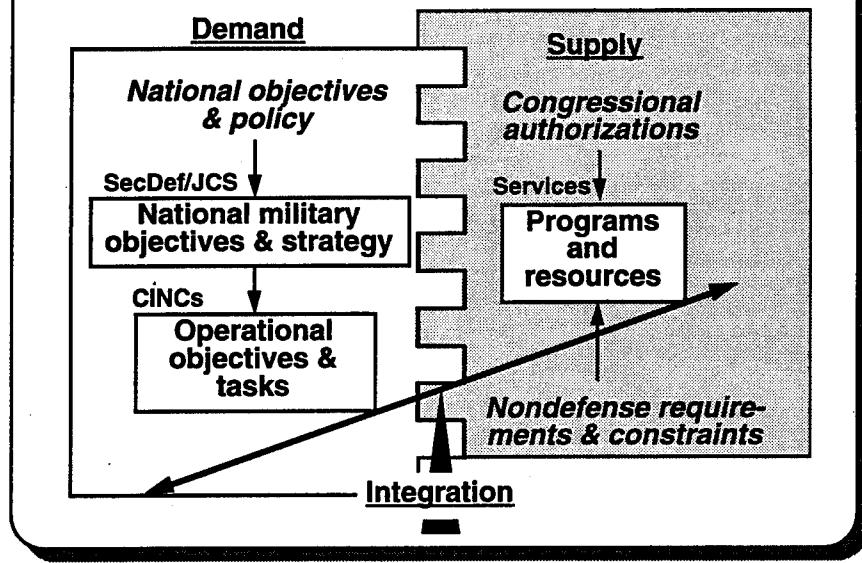
The implication of all this is that there is a real need to develop a well-regarded and sound decisionmaking process with all elements understood by all participants—from the major commanders to the Joint Staff, the Services, OSD, the White House, and Congress.

The demand for resources, goals, and objectives originates with the Constitution (“provide for the common defense”) and comes down through the president, the secretary of defense (SecDef), the Joint Chiefs of Staff, and elsewhere—in forms that are usually appropriate for their individual purposes but can be confusing, imprecise, incomplete, or ambiguous when viewed collectively.

Strong, reasoned analysis of trade-offs requires relating programs, which may be changed, to a standard that is assumed to be an absolute. For a CINC or other major commander, the absolute is the set of objectives for the command, required by higher authority. If not given a set of exhaustive and measurable objectives, the commander must derive them from whatever has been given.

In the new, competitive environment, each demander of resources will have to specify how the resources support his objectives. The rationale must be a continuous thread from objectives to the tasks, programs, and resources. This analysis generally requires specifying a concept of operations (or alternative concepts of operations) for successfully performing each task. A concept of operations must link subtasks or capabilities together from beginning to end (or end to end), to ensure balance and overall capability.

Defense Resourcing Must Integrate Supply and Demand



Relationships between capabilities and program decisions need to be identified, to allow making trade-offs.

Balancing supply and demand is an intuitive metaphor, but it is more precise to say that supply and demand must be integrated, so that the DoD total force posture is itself balanced.

The figure above represents demand and supply within DoD. National-level goals, objectives, and policies are exogenous demands. The demand for resources always exceeds the supply of available assets. Thus, choices and integration must be carefully thought through.

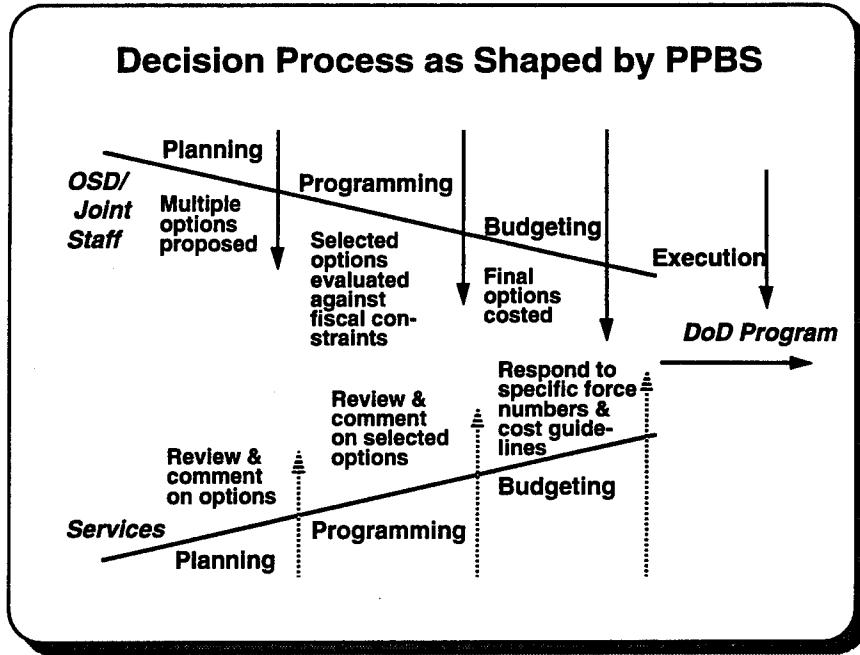
At the department level, SecDef and the Joint Staff, there are requirements (demand) in the form of national military objectives and strategy.

CINCs also make demands on the department, defining their operational objectives (consistent with higher-level objectives) and tasks.

The services are on the supply side, with programs and resources. From a business perspective, they have their own objectives (also consistent with higher-level objectives) and tasks.

Congressional authorizations exogenously help with the supply side, but competing, nondefense requirements, priorities, and constraints can work against supplying defense requirements.

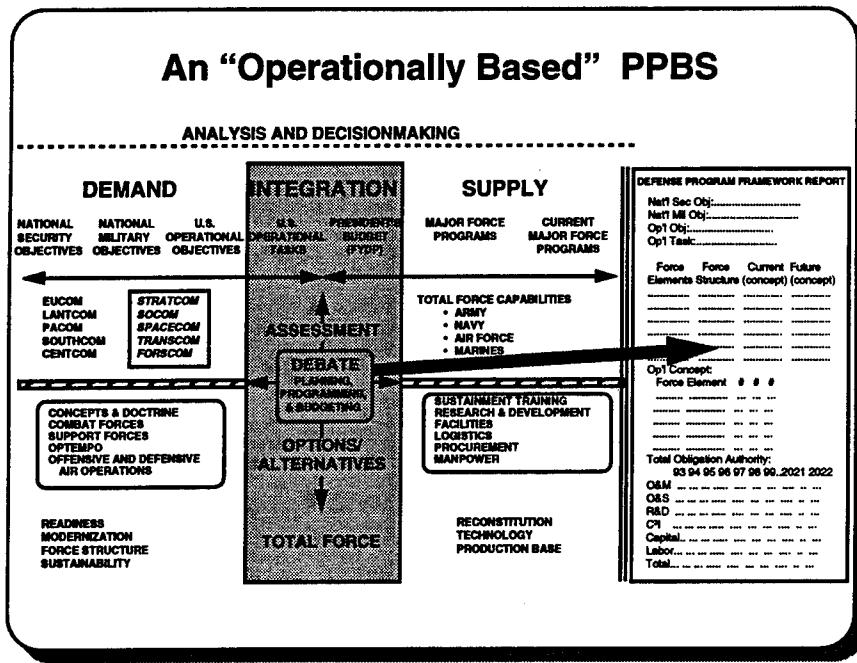
It is envisioned that future DoD information system development, use, and management will more frequently involve the migration and evolution of assets already in place, pointing toward software standardization and development of shared data systems. Meeting this objective requires development of a functionally oriented business case-analysis methodology that supports the concept of continual process modernization as the new way of doing business within DoD.



The DoD Decision Process

Decisionmaking in the Department of Defense is shaped by the Planning, Programming, and Budgeting System (PPBS) process.² In each of three phases—planning, programming, and budgeting—the Office of the Secretary of Defense (OSD) and the Joint Staff interact with the Services. As a PPBS cycle progresses, the choices among options narrow, and the requirements become more detailed and concrete. The end result is the DoD Program, which becomes part of the President’s Budget. As Congress debates and finalizes the budget, analysis performed during the PPBS process shown here is used as a basis for congressional testimony.

²The PPBS is a biennial process used to develop a plan, a program, and a budget for the DoD as outlined in *DoD Instruction 7045.7*. It provides a framework for making decisions on current and future programs through three interrelated phases (planning, programming, and budgeting), consistent with national security objectives, policies, and strategies. It is the primary system used by DoD to manage the department’s military functions. See *Army Command and Management: Theory and Practice*, U.S. Army War College, 1990–1991.



With inclusion of a role for CINCs, resulting from the Goldwater-Nichols reforms, the process needs an “operationally based” PPBS, with an enhanced integration function, to improve the linkages between higher-level “demands” (national security objectives, national military objectives, and operational objectives) and “supplies” (the major new and current force programs).

As depicted in the diagram above, integration matches up the most detailed statement of demands (operational tasks) with the most comprehensive statement of supply (the Future-Year Defense Program [FYDP], as embodied in the President’s Budget). On the demand side, national objectives are pursued operationally by the CINCs’ plans, which, in turn, are both supported and constrained by concepts and doctrine, combat and support forces, operating tempo (OPTEMPO), and such things as air operations. These can be characterized as demands for readiness, modernization, force structure, or sustainability—sometimes referred to as the “four pillars.”

Just as CINC demands must be aggregated to the national level, so too the service supply of forces must be aggregated to total force capabilities. Forces are supported and constrained by sustainment training, research and development, facilities, logistics, procurement, and manpower—which can be related to reconstitution, technology, and the production base.

As suggested by the diagram, integration comes about through generation, debate, and assessment of options or alternatives through the PPBS process. This is done across the total force.

The list of demands always far exceeds the available resources. To have a "balanced" program, one for which demands are balanced against supply, fiscally constrained options/alternatives must be developed and assessed. This task is performed by OSD and the Joint Staff, which supports the chairman of the Joint Chiefs of Staff. Another dimension to the integration function is the crosswalk from operational needs to an articulation of these needs in a programmatic manner. The crosswalk is represented by the arrow, which shows the linkage to the DoD program.

Here, we show a notional Defense Program Framework Report, a tool in the integration process. It would explicitly identify objectives, tasks, and operational concepts being served by a program. It would also show how a project would be resourced over time. A report such as this would be prepared for each program element. The framework, therefore, provides a common tableau structure showing how DoD manages and allocates all of its resources.

Imperatives of “Reinventing Government”

Be driven by missions, not by unchallenged rules.

Meet the needs of the customer, not the bureaucracy:

- **Enable the bureaucracy to do its “thing” but to be sufficiently flexible to allow innovation.**

The current (and future) defense environment, as identified and discussed for government in general by David Osborne and Ted Gaebler in their book, *Reinventing Government: How the Entrepreneurial Spirit Is Transforming the Public Sector*,³ poses imperatives to drive activities by missions (rather than unchallenged rules) and to meet the needs of the “customer,” not just the bureaucracy.

The key to altering bureaucratic processes is to provide sufficient flexibility to enable individuals to be innovative, but to remain sufficiently structured so as not to threaten the accepted activities of the bureaucracy.

³Osborne, David, and Ted Gaebler, *Reinventing Government: How the Entrepreneurial Spirit Is Transforming the Public Sector*, Penguin Books, New York, 1992. See also Vice President Al Gore’s 1993 report, *The National Performance Review*.

The CIM Initiative

Commenced in 1990 to improve management of the DoD to reduce costs and standardize processes

- Implement new or improved business methods
- Create more uniform business processes for common functions
 - Reduce or eliminate processes and information systems performing the same functions
 - Establish consistent data standards
- Define common functional requirements
- Improve standardization, quality, and consistency of data from DoD management information systems and develop standard information systems
- Streamline and standardize financial management

3. CORPORATE INFORMATION MANAGEMENT

The CIM initiative, begun in 1990, means to improve business methods throughout the DoD. Why should such a broad goal be approached from the perspective of information management? Here, suffice it to say that this is an information age—in business and in battle.

Information management has become so important that it can mean the difference between success and failure.

CIM is an ambitious attempt to bring DoD more truly and effectively into the information age. Its goal is to streamline information management so that clear and consistent information can contribute to “good business practices.”

We view CIM from a perspective we believe is true to its origins but that is far less computer systems-focused than that of most people familiar with CIM.

Features of Corporate Information Management

<u>Planning</u>	<u>Representation</u>	<u>Evaluation</u>
Top-down process using business terms	DoD Enterprise Model IDEF diagrams	Conformance with design principles Value added

Defense can be viewed in different ways; the CIM view is as a business. The CIM approach is to plan and structure DoD as a business, through a top-down design process, such that higher ends are achieved by activities, which, in turn, are supported by information management and other means. All is to be done effectively and efficiently.

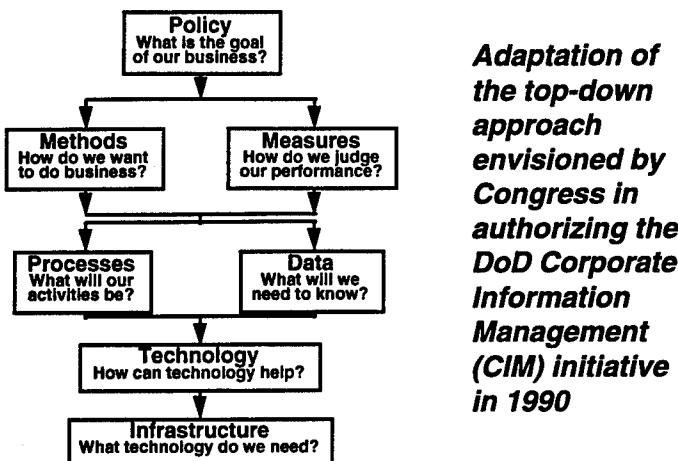
CIM includes an Enterprise Model for the DoD, representing relationships among activities serving the Constitutional end, to provide for the common defense.⁴ CIM makes extensive use of a diagramming technique, IDEF.⁵

Evaluation of activities and information management is largely through verifying conformance with design principles, including the concept of “value added” by activities.

⁴Office of the Director of Defense Information, Office of the Secretary of Defense, *The DoD Enterprise Model: A White Paper*, February 1993.

⁵IDEF modeling techniques were derived from the Integrated Computer Aided Manufacturing (ICAM) program sponsored by the U.S. Air Force. The acronym IDEF stands for ICAM Definition Languages.

CIM Planning: Top-Down Process Applying Sound Business Practices



Adaptation of the top-down approach envisioned by Congress in authorizing the DoD Corporate Information Management (CIM) initiative in 1990

CIM Planning

An Executive Level Group of high-level industry and DoD officials, convened by the Deputy Secretary of Defense in 1989, suggested this top-down approach for implementing CIM.

General Accounting Office report 92-77 described the process as follows:

Defense's policies must change before business methods can be simplified and standardized across the Department. Business methods are comprised of predetermined processes and internal controls for providing services or products, and their effectiveness is determined by performance measurements. Before business methods can be changed, they must be documented by modeling both the current processes and data utilized by specific business methods. New process and data models are then used to document proposed changes to the business methods. In order for reengineering to succeed, business methods must be continuously re-examined and process and data models frequently updated. According to the model, the last step Defense managers should take is developing and acquiring a data processing and communications infrastructure [here shown as "technology" and "infrastructure"] that supports the department's re-engineered business processes. Information systems are to be designed only after business processes are documented and simplified. Buying

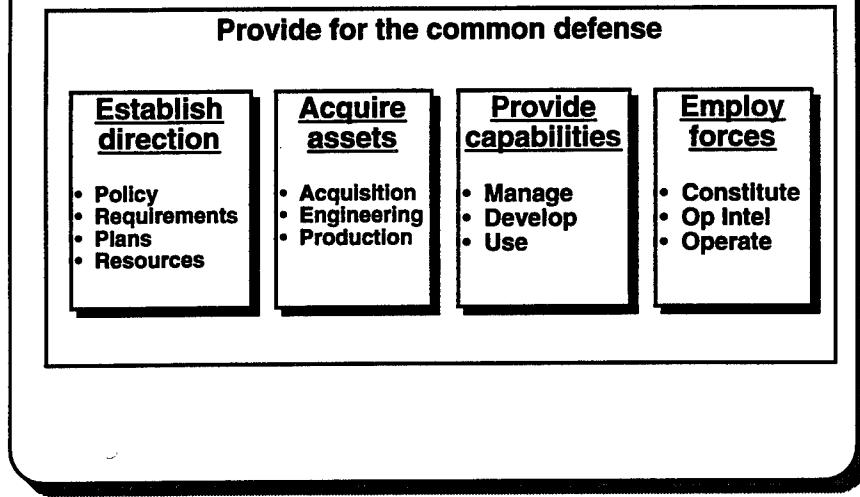
technology before changing business processes may waste time and money by automating old and inefficient business methods.⁶

In the original version of the diagram shown on the previous page, what we are calling a design and planning process is termed an elements and relationships model, in which the elements have associated with them the following questions:

- Policy: What is the goal of our business?
- Business Methods: How do we want to do business?
- Business Measures of Performance: How do we judge how well we do business?
- Process Models: What will the activities of our business be?
- Data Models: What will we need to know to do business?
- Information Systems: How can technology help us do business?
- Computing and Communication Infrastructure: What information technology will support our business?

⁶General Accounting Office, GAO/IMTEC-92-77, pp. 2-3.

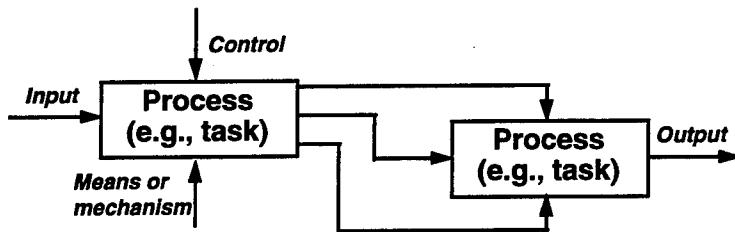
CIM Representation: The DoD Enterprise Model



CIM Representation

The DoD Enterprise Model represents the department at the corporate level, as a business whose mission is to provide for the common defense. The model posits four major "enterprise areas" of the business: establish direction, acquire assets, provide capabilities, and employ forces. Directing includes policy, requirements, plans, and resources. Acquiring assets includes acquisition, engineering, and production. Providing capabilities involves management, development, and use. Employing includes constituting forces, providing operational intelligence, and operating the forces. The full model decomposes these into activities and uses IDEF diagrams to show relationships among them.

CIM Representation: IDEF Diagrams



IDEF diagrams are similar to data flow diagrams or flow charts, but the orientation of the arrows has meaning: inputs go in from the left, outputs out from the right, control in from the top, and means or mechanisms in from the bottom. As with data flow diagrams, each process can, if appropriate, be decomposed into more detailed processes.

CIM Evaluation: Principles Consistent with Current DoD Streamlining

- Simplify, eliminate, and integrate processes and activities before automating them.
- Enter data once; use it often.
- Change incrementally.
- Use IDEF activity modeling.
- Evaluate value added by activities and information.

CIM Evaluation

CIM principles are consistent with current DoD streamlining efforts—which were prompted to a considerable degree by what American businesses have learned in adapting to Japanese and other competition.

First on this list is to simplify, eliminate, and integrate processes and activities before automating them. That would seem to be common sense—make changes at low cost manually before investing heavily in automating what may turn out to be bad ideas. Honored in theory, this principle is often ignored in practice, even by CIM practitioners.

Another principle of efficient data use is to enter it once and use it often. Also, it is often less risky to implement change incrementally.

IDEF activity modeling is useful in evaluating whether each output has a use as input to *something*. It can also reveal, visually, whether processes are efficient.

Finally, evaluation should consider the value added by each activity. In general, each activity should add *some* value, and that value added should equal or exceed the cost of the activity. For the most part, CIM has not been successful in applying this principle to DoD activities. Obvious exceptions are production and manufacturing processes, whose value added can be estimated. The same observation applies to private-sector businesses—it is as difficult, if not foolhardy, to estimate the value added of a CEO as it is of a general.

Incentives and Disincentives for Using CIM

- CIM promises large cost savings, but since DoD is nonprofit, this may be a weak incentive.
- Centralized data systems give benefits and power to those who control them, sometimes at the expense of others.
- CIM will presumably be more welcomed by those who are conscious of having a problem than by those who don't see need for change.

There are incentives for DoD organizations to adopt CIM, but there are also strong disincentives.

Cost-savings promised by CIM may be a strong incentive to Congress, but budget maintenance or growth is often a stronger incentive for managers, especially in nonprofit organizations, such as the DoD.

Similarly, centralized or standardized data systems may be efficient and better in some sense for the overall organization. The accompanying disincentive to those losing control over their own proprietary data or systems is loss of power.

Managers who know they have problems may see incentives in trying something new, such as CIM. Other managers, who are "getting by," often see change as threatening.

STT Compared to CIM

	<u>Planning</u>	<u>Representation</u>	<u>Evaluation</u>
CIM	Top-down process using business terms	DoD Enterprise Model	Conformance with design principles
		IDEF diagrams	Value added
STT	Top-down process using military terms	Continuous thread	System reliability
		End to end	Inferred capability
			Intertemporal comparison

4. STRATEGY-TO-TASKS FRAMEWORK

The initial STT framework was developed at RAND for the Air Force during the late 1980s and is currently used by several DoD organizations.⁷ Extensions of the work to United States Forces Korea (USFK) and United States Special Operations Command (USSOCOM) have included resource management; the extended version is called Strategy-to-Tasks Resource Management (STRM).

In planning, STT uses traditional military terms, as the name “strategy to tasks” suggests. It is top-down, in that means are subordinated to ends, but the work of planning need not be purely top down, as long as there is top-down connectivity.

Such connectivity is referred to in STT representation as a “continuous thread.” That is, the dependencies or other relationships among concepts at different levels of the hierarchy or taxonomy of concepts must be represented explicitly, so they can be traced as a continuous logical thread. Typically, each operational task comprises a chain of subtasks, which STT requires be represented as an “end-to-end” concept.

⁷See Glenn A. Kent, *A Framework for Defense Planning*, RAND, R-3721-AF/OSD, 1989, and David E. Thaler, *Strategies to Tasks: A Framework for Linking Means and Ends*, RAND, MR-300-AF, 1993.

STT Planning

- **Builds an audit trail relating policy, strategy, and/or doctrine to tasks, programs, and/or resources**
 - Makes rationale explicit
 - Promotes responsibility and accountability
- **A discipline rather than a system**
 - Requires explicit assessment
 - Using best available means

Evaluation is done by assessing “system reliability” of ability to perform operational tasks end to end. Capability is assessed and inferred upward, ultimately to assess whether top-level goals can be achieved. Intertemporal comparisons are made, to assess implications of programs, changing threats, and other factors over time.

STT Planning

RAND’s STT methodology provides an audit trail of policy and doctrine down to programs, functional areas, and resources.

Although computer programs can be used in applying the STT framework, it is best thought of as a *discipline*, rather than a system. The discipline requires explicit assessment—by whatever means seem most appropriate—of whether objectives are adequately achieved or achievable if all of their related tasks are performed, if capabilities are sufficient for their associated tasks, and if forces and programs provide their associated capabilities.

When expanded into a resource management system, STT allows comparison of alternative programs, forces, and the capabilities they provide, for the fiscally constrained planning required for an operationally based PPBS.⁸

⁸See Leslie Lewis and C. Robert Roll, *Strategy-to-Tasks: A Methodology for Resource Allocation and Management*, RAND, P-7839, 1993, for distinctions between the original formulation of STT and its expansion into resource management.

STT Resource Management Planning

Resource management process for the planning and programming phases of the PPBS

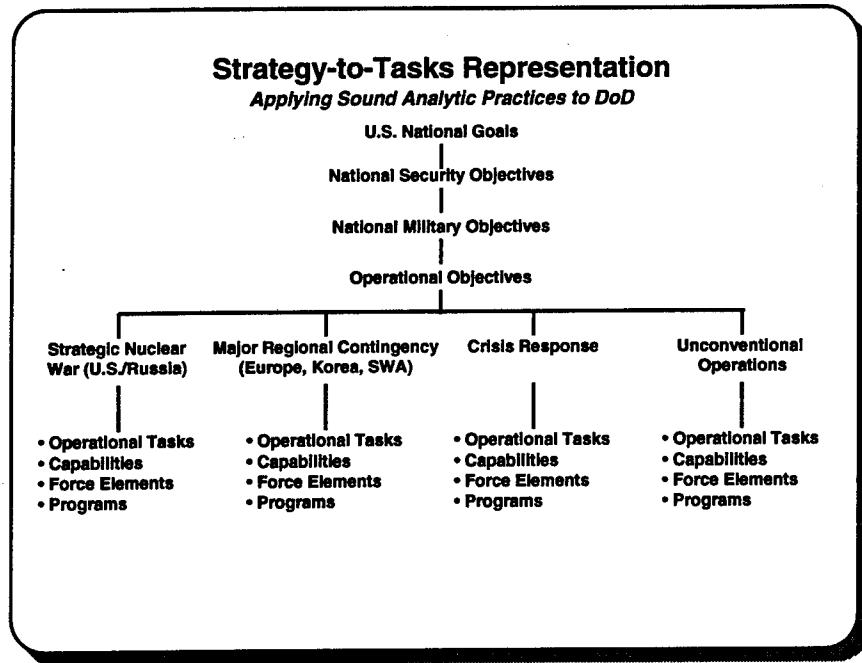
Initially developed to focus on system acquisition

- **Applications expanded to include all resource decisionmaking**

Provides decisionmakers with an end-to-end concept of operations

- **Focuses on the evaluation of current programs from national security strategy to programs**
- **Demonstrates the relationship of strategies down to tasks and programs**

Relationships and dependencies, whether drawn down from objectives or up from programs, must form a continuous, vertical thread if they are to contribute to a well-regarded and sound decisionmaking process with all elements understood by all participants. Achieving any objective requires a strategy comprising related tasks, what we call an end-to-end concept of operations, a continuous, horizontal thread.



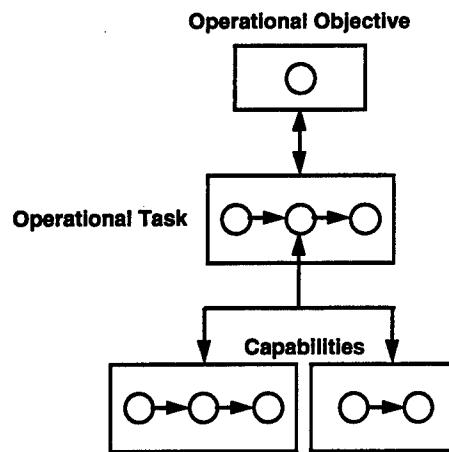
STT Representation

The STT process begins with a top-down description that links concepts from U.S. national goals, national security objectives, and national military objectives to operational objectives, operational tasks, capabilities, force elements, and programs. The object is to describe the components and their linkages as continuous threads, from "strategy" to "tasks" (actually from national goals to programs), so that in looking down a thread one sees *what* is being done to accomplish the higher concepts and looking up a thread one sees *why* a program, capability, etc., exists.

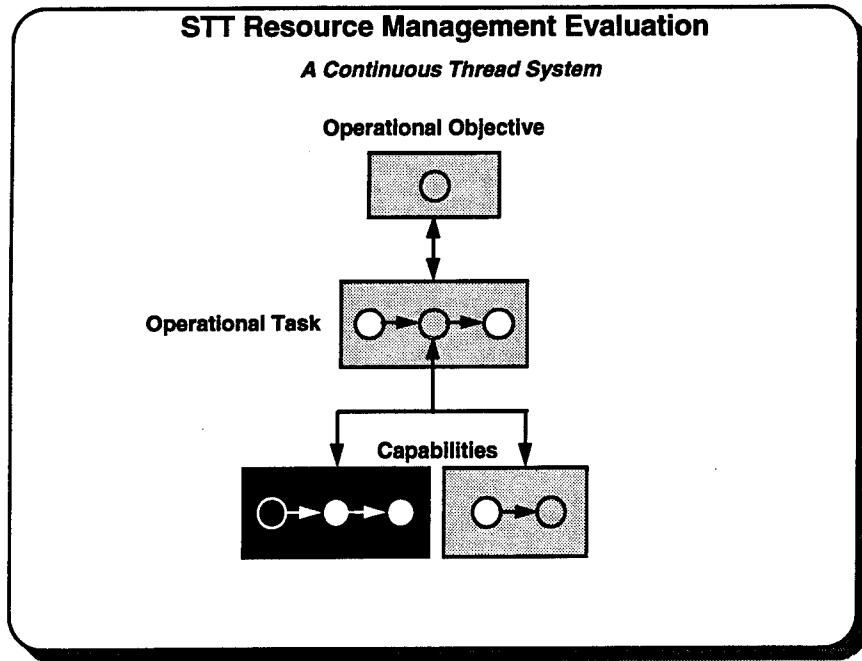
The representation may vary as it is applied for different purposes. In the figure above, operational objectives are considered for four classes: strategic nuclear, major regional contingency (MRC), crisis response, and unconventional operations.

STT Resource Management Representation

A Continuous Thread System



The diagram above is meant to depict vertical threads linking three levels, with horizontal threads showing the end-to-end linkages.



STT Evaluation

The process then involves a bottom-up assessment. Beginning at the bottom of a thread, analysts assess how well each program provides the capability it is meant to provide. Using this assessment, analysts then assess how well available capabilities enable tasks to be performed. This is repeated until one can assess whether the objectives can be achieved. This, in essence, is the process used in the DoD Bottom-Up Review.

In the diagram above, the capability to the left consists of a series of three subcapabilities; the leftmost is evaluated as inadequate, the others as adequate. Because the end-to-end relationship is a series, the capability must be evaluated as its weakest link, inadequate. Similarly, the capability to the right, with adequate and marginal subcapabilities, is evaluated as marginal. Both capabilities support a subtask, which is evaluated as the strongest of the "parallel" supporting capabilities, here marginal. Although the other subtasks in series are evaluated as adequate, the middle subtask is the weakest link, so the task and the objective it serves are evaluated as marginal.

To improve the evaluation in the future, the leftmost subcapability could be brought up from inadequate to adequate (marginal would not suffice), the rightmost subcapability could be improved from marginal to adequate, or a new capability evaluated as adequate could be added in parallel to the two existing capabilities.

This is something of a simplification, as there can be situations in which two marginal parallel capabilities "add up" to adequate performance of the task they support. STT does not prescribe a formal or rigid calculus for combining these evaluations, as long as evaluations are represented explicitly.

STT provides concepts and some tools (principally spreadsheets) for these assessments; it does not provide an "answer machine" or preferred model or methodology for making individual assessments. Our experience strongly suggests that there is no one model or methodology best suited for these assessments.

The top-down description, coupled with the bottom-up assessment for present and posited future forces, is essentially what was in the original formulation of STT. Strategy-to-Tasks Resource Management carries the process further in two directions, going down a level from programs—to resources—and adding a bottom-up consideration of trade-offs.

Trade-offs at the program and capability levels can be standard, comparative cost-benefit analyses. At the higher levels, the trade-offs occur among alternative ways to perform tasks or concepts of operations involving relationships among tasks. Cost estimates are performed using standard methods, as appropriate, but measures of benefit are ultimately associated with ability to achieve the higher-level objectives. Thus, the intent is to avoid suboptimizing benefits.

Research Task

- **Link CIM to such high-level activities as national security strategy and defense doctrine.**
- **Develop a CIM/STT framework.**
- **Apply CIM/STT framework at the CINC level, e.g., USSOCOM, USFK.**

5. LINKING THE CIM AND STT CONCEPTS

Research Task

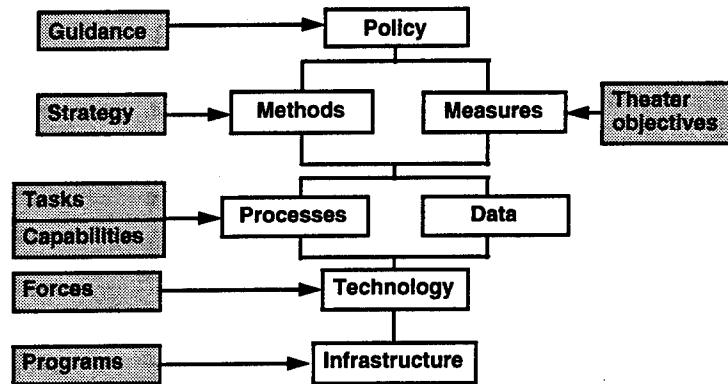
The purpose of the study was to apply the STT methodology to the CIM process. In particular, the first step in the CIM process is to develop a functional architecture, which is initially done at a very high level of aggregation—linking the national defense doctrine and policy to the joint warfighting plans and operations, then to the PPBS and supporting services.

The research task was to assess how the STT framework could be applied to the CIM initiative. It was recognized that some minor modifications to the taxonomy would be necessary to capture the breadth and scope of the CIM initiative. This was based on a more detailed analysis of the CIM initiative: an assessment of the various CIM functions, how they are currently linked, and how they might be linked in the future. The modified STT framework ties together national defense doctrine and policy, joint warfighting plans and operations, and the PPBS, in a way designed to function within the constraints of MOP-39, which limits distribution of war plans.

In developing ways to apply STT to CIM, RAND has drawn on its experience with two major military commands, the U.S. Forces Korea/Combined Forces Command (USFK/CFC) and U.S. Special Operations Command (USSOCOM), and applied it to selected aspects of their operations and “businesses.”

The required linkage to the PPBS really focuses on how one could link operational and business planning. The STT process links CINC and service preparational planning to actual resources and programs. The CIM initiative focuses on business planning, which may be thought of as a method of making investment decisions based on an assessment of all of DoD's resources. This is critical in a period of resource constraints. The concept of sound business decisions also implies the consistency of data across all of the resource categories.

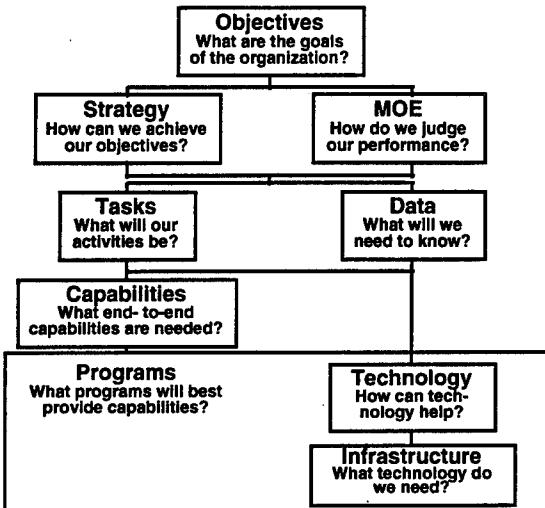
Mapping STT Concepts into CIM Concepts



CIM/STT Planning

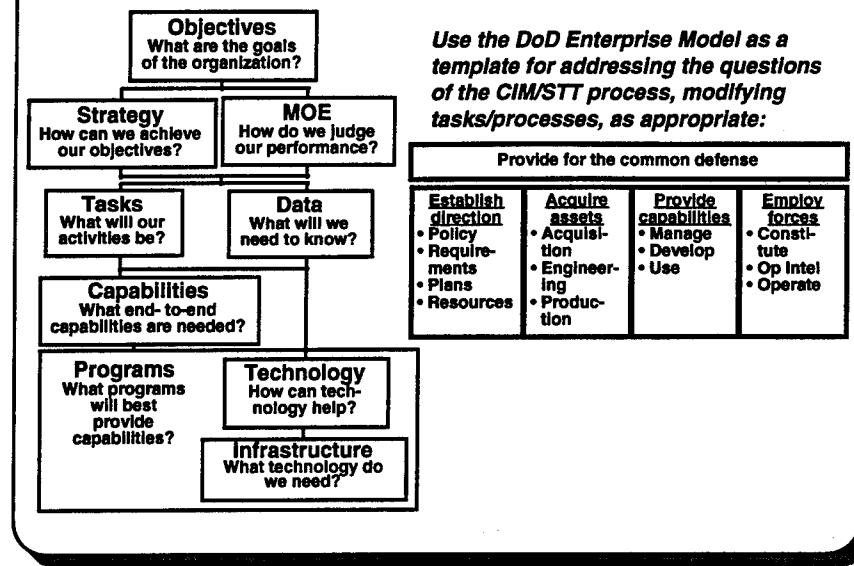
STT concepts (shown shaded) map rather directly into those of the CIM process. The only CIM concept not treated explicitly by STT is that of data models.

Combining CIM and STT



Here, we further combine CIM and STT concepts. We have used the STT term *objectives* in lieu of the CIM *policy*, but either term would suffice. Similarly, we use *strategy* for *methods* and *tasks* for *processes*. We add *capabilities*, which is the supply side of the demand represented by *tasks* and is not explicitly represented in the CIM process. We add *data*, which is not explicitly represented in STT. Technology and infrastructure are within the broader category of *programs*.

Using CIM/STT and the DoD Enterprise Model



The way we envision CIM/STT being applied is shown here.

The first step entails an identification of which CIM/STT process questions, shown in boxes on the left side of the chart, are open to review. Ideally, all processes would be open to reexamination, but in practice, as we have suggested, the more fundamental questions are reexamined only when the organization is under new leadership or when changing conditions force it upon the old leadership. The questions that can be addressed would then be addressed.

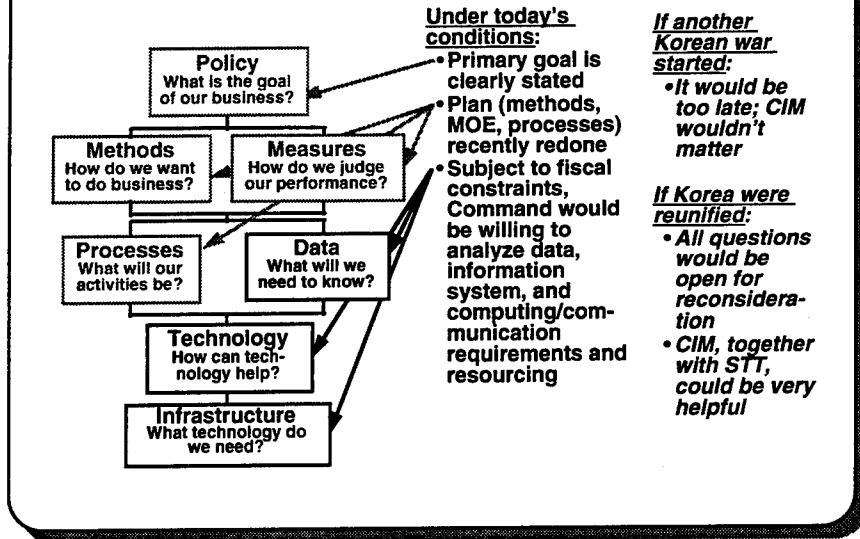
It can be expected that the bottom-up assessment and trade-off phases of STT process will result in some assessments of inadequacy or insufficiency. At the lower levels in the hierarchy, assessment is presently addressed routinely within the PPBS. At these levels, STT can help by identifying programs and forces that either must not be cut (lest they jeopardize tasks essential to execution of strategy and achievement of objectives) or can be cut (because they contribute little to what is needed). At the higher levels in the hierarchy, today's PPBS is ill-equipped to address inadequacies, for remedies don't just mean programmatic changes but also changes in tasks, strategies, or objectives—or in CIM's language: how we should organize our work, how we should do business, or what business(es) we should be in.

CIM's DoD Enterprise Model is shown in abbreviated form to the right. It can serve as an example for reference in the process of addressing the series of questions in the CIM/STT process. As an example, it will likely apply in part almost directly to the specific organization being analyzed. Even where it must be tailored, it can serve as a guide to completeness and as a kind of "sanity check."

STT can help identify the level (e.g., tasks, capabilities, technology) where there are inadequacies that cannot be resolved without all or part of the CIM process.

Because CIM may be accepted more readily by leaders or managers who know they have a problem, use of STT to identify problems may be especially important to CIM's succeeding.

Considerations in Applying the CIM Process to USFK



Could the entire CIM process be applied to a command, such as USFK, under today's conditions? Probably not. The fundamental goal of USFK's "business" is well understood and not presently open to revision: to bring about a peaceful outcome to the long Korean struggle, principally by maintaining ready forces capable of defending the Republic of Korea and, thereby, deterring North Korean attack. The methods of doing this, the measures of performance, and the major implementing tasks and processes have recently been reevaluated and revised in the form of the JCS-approved operations plan for defense of Korea. Because subordinate commanders use this plan as the basis for their planning and training, it cannot be substantially revised continually, and it certainly will not be zero-based solely for the sake of improving information management. At most, USFK would presently be willing to reassess its data, information, and computing requirements.

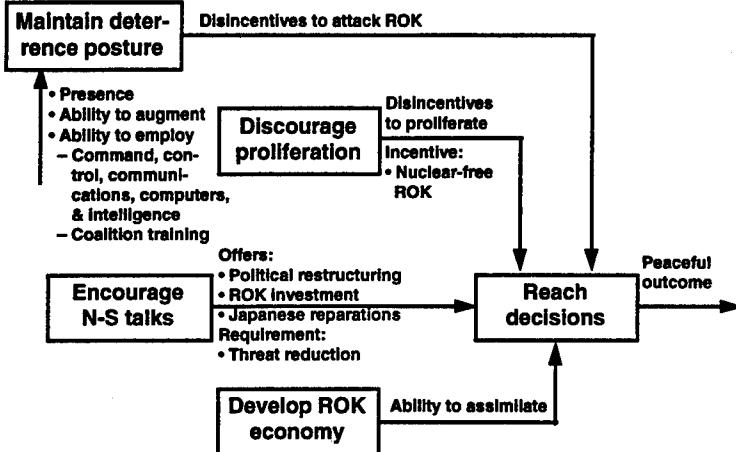
That is not necessarily a permanent condition. If war were to come, assuming that the United States honored its commitments, that war would be funded and executed expeditiously, without regard to CIM or the finer points of enlightened "business" practices. If, on the other hand, Korea were reunified, the purpose of a U.S. presence in Korea and all other questions would be open for reconsideration, and CIM, together with STT, could be very helpful.

The next series of figures shows how they might be linked.

USFK-Application: Issues

Objective: Peaceful Outcome to the Half-Century Korean Struggle

Strategy: Lure North Korea out of its Cold War stance



CIM/STT Representation

We used the April 1993 testimony of General Robert RisCassi, Commander, U.S. Forces Korea, before the Senate Armed Services Committee as the basis of this diagram, which loosely conforms to IDEF conventions.

General RisCassi's stated objective is a peaceful outcome to the 50 years of struggle on the Korean peninsula. His strategy is to lure North Korea out of its Cold War stance. There is, of course, another objective if peace fails, and there is a strategy to achieve it.

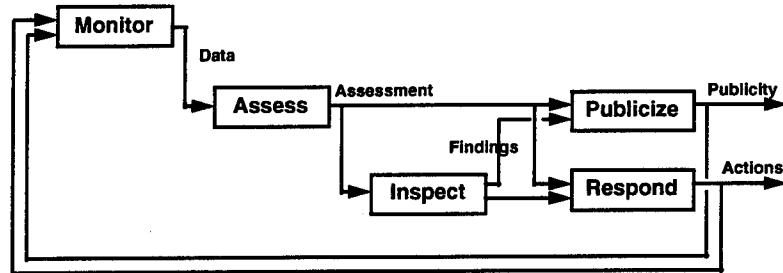
Four efforts are being pursued to influence North (and South) Korean decisions: deterrence, North-South talks, nonproliferation, and further development of the ROK economy.

This diagram (and more detailed analyses supporting it) addresses the CIM/STT process strategy question: How can we achieve our objective? For each of the four tasks shown, the CINC should ask if capabilities are adequate for performing it. If the answer for each task is "yes," and if the strategy truly is complete and sound, then there is reason to believe that the objective is achievable.

The next chart examines the task of discouraging proliferation in more detail.

USFK-Application

Task: Discourage proliferation



How can we realistically expect to discourage North Korean nuclear weapon acquisition?

This diagram suggests an end-to-end approach, consisting of five sub-tasks: monitoring North Korea, assessing the data, inspecting suspected nuclear sites, publicizing the findings, and responding as appropriate. Currently, North Korea is not allowing the International Atomic Energy Agency (IAEA) to conduct inspections, so the inspection task is inactive, though the United States and other countries are pressing North Korea to allow inspections. If this continues, the overall concept for discouraging proliferation may have to be re-examined for possible revision or replacement.

This particular diagram of the concept may or may not be the "right" one, but presenting it invites critical review, which may improve the concept.

The next chart carries the process one step further.

Resourcing Task to Discourage Proliferation

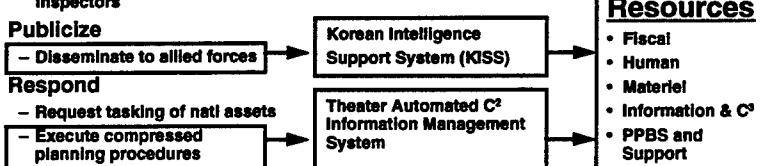
Tasks

- **Monitor**
 - Establish intel center
 - Identify intel collection requirements
 - Develop collection plan
- **Assess**
 - Prepare intel estimate
- **Inspect**
 - Coordinate with IAEA Inspectors
- **Publicize**
 - Disseminate to allied forces
- **Respond**
 - Request tasking of national assets
 - Execute compressed planning procedures

Program Elements

Command, Control, and Communication Systems

Air Support Operations Center (ASOC) Remote Radios (USAF)



Resources

- **Fiscal**
- **Human**
- **Materiel**
- **Information & C³**
- **PPBS and Support**

Here the subtasks are further decomposed, to the level of Joint Mission Essential Task (JMET) supporting tasks. The list is representative, not complete.

Two of the subtasks are shown mapped to USFK C³ program elements: the Korean Intelligence Support System and the Theater Automated C2 Information Management System.

The next step in the linkage is to identify resources required for these programs.

Specific System Example

Objective: Peaceful outcome in Korea
Strategy: Lure NK out of Cold War stance
Task: Discourage proliferation/Respond/
Execute compressed planning
procedures
Decision Package: C³I
Program Elements: Information Management & C³I
Information Management System

Resources:	93	94	95	96	97	98
• O&M	xx	xx	xx	xx	xx	xx
• PROC	xx	xx	xx	xx	xx	xx
• RDTE	xx	xx	xx	xx	xx	xx
• Total	xx	xx	xx	xx	xx	xx

STT calls for displaying information on decision packages and program elements in their top-down context from objective to strategy to task. It also requires a breakdown of resources across the period of the FYDP and an assessment of capability to perform the task, given the program elements in the FYDP.

While the USFK example shows an application of a “continuous thread” audit trail, work done for USSOCOM, described in the next two pages, illustrates how CIM/STT concepts can address trade-offs.

Apply CIM/STT to U.S. Special Operations Command (USSOCOM)

Needed to reorient toward capability trade-offs

- Resources should be viewed as collections of functional capabilities.
- Capabilities include all the assets necessary to execute a SOCOM mission.

Created six general resource categories to facilitate trade-offs:

- Capital, manpower/labor, O&S (spares, fuel, etc.), overhead, R&D, and C³I
- CIM provides key linkages to operational and business practices through all PPBS phases

Findings: CIM can be linked to USSOCOM's resource allocation process

- All functions and costs are collected.
- Links national strategy, program, to financial and information management.
- Consistent information across all PPBS phases.

Application of CIM/STT to USSOCOM revealed the need to reorient previously developed STT taxonomy toward capability trade-offs. Here, we viewed resources as collections of functional capabilities and capabilities as sets of assets necessary to execute a SOCOM mission.

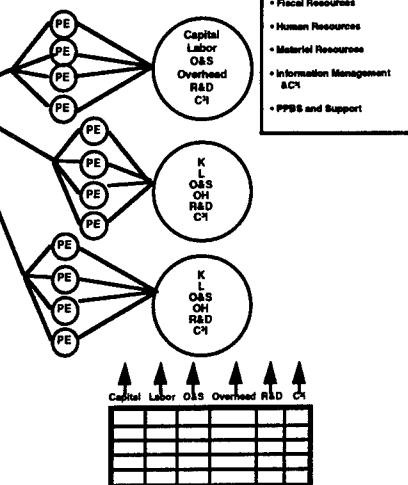
Six general resource categories were identified to facilitate trade-offs: capital, manpower/labor, O&S, overhead, R&D, and C³I.

We found that CIM provides key linkages to operational and business practices through all phases of USSOCOM's involvement in the PPBS. More specifically, all functions and costs are collected. CIM/STT links national strategy and programs to financial and information management, providing consistent information and representation across all PPBS phases.

Applying STRM to USSOCOM's Resource Allocation Process

Warfighting Capability

- Strategic Agility
 - SO - Direct Action
 - SO - Strategic Reconnaissance
 - SO - Counter-Terrorism
 - SO - Search and Rescue
 - SO - Anti-terrorism and Other Security Activities
 - SO - Special Activities
 - PSYOP - Support of Deception Operations
 - PSYOP - Support of Direct Action, Unconventional Warfare and Special Recon
 - PSYOP - Support of Counter-terrorist Operations
 - PSYOP - Provide Psychological Assessments
 - PSYOP - Support of Contingency Operations
 - PSYOP - Support of Military Deception Operations
 - PSYOP - Support of Noncombatant Programs
 - CA - Support Battlefield/General-Purpose Operations
 - CA - Support Counter- and Anti-Terrorism Operations
 - CA - Support Peacetime Contingency Operations
 - CA - Support Noncombatant Evacuation Operations



This illustrates how STRM can be applied to USSOCOM's resource allocation process.

Within SOCOM's warfighting capability is the operational objective of Strategic Agility, which consists of the tasks and several subtasks. The three tasks shown are special operations (SO), psychological operations (PSYOP), and civil affairs (CA).

Each subtask, such as Direct Action, requires resourcing of types indicated. Resources are packaged and approved in terms of specific program elements (PEs).

Questions for the CINC to Address for Each of His Objectives

- **What is the concept for achieving it?**
- **How good are our capabilities for doing each task?**
- **How do our capabilities depend on programming and budgeting decisions?**
- **What options and fallbacks do we have?**

CIM/STT Evaluation

These are questions we would recommend for a CINC to ask in considering the ability of his organization to achieve its objectives. These questions are consistent with both the CIM and STT approaches.

On the next page, we return to a specific system example we discussed with respect to USFK, now adding an assessment or evaluation.

Specific System Example

Objective:	Peaceful outcome in Korea					
Strategy:	Lure NK out of Cold War stance					
Task:	Discourage proliferation/Respond/ Execute compressed planning procedures					
Decision Package:	C ³ I					
Program Elements:	Information Management & C ³ I Information Management System					
Resources:	93	94	95	96	97	98
• O&M	xx	xx	xx	xx	xx	xx
• PROC	xx	xx	xx	xx	xx	xx
• RDTE	xx	xx	xx	xx	xx	xx
• Total	xx	xx	xx	xx	xx	xx
Assessment	●	●	●	○	○	○

STT does not dictate how the assessment should be made, but it asserts that some assessment must be made.

Here, shading shows that the CINC has assessed that this program element would begin in FY95 to improve his ability to perform the task, with fully adequate capability being achieved in FY96 and the out-years. The crosswalk to CIM occurs with the program elements, which are consistent across all resource categories. They are then entered into the FYDP in one of the major funding categories: (1) O&M, (2) Procurement, or (3) Research, Development, Test, and Evaluation.

Corporate Information Management Should Be Top-Down

- **It is suboptimal to begin improving corporate-wide information management at the bottom, with data bases and computer systems.**
- **The greatest potential gains are from a top-down approach.**

6. IMPLEMENTATION ISSUES

Because there is so much information potentially available and because data, databases, retrieval systems, and computers are so complex and difficult to understand and control, there is a natural inclination to decentralize information management in order to work with manageable systems.

For understandable reasons, this has not proceeded in DoD in accordance with any master plan. Instead, information systems have been developed largely independently, often expensively, and often redundantly.

Information management could be improved in a bottom-up review fashion—and this is what has happened largely since the CIM initiative started in 1990. But that is clearly not the optimal way to go, as it excludes from consideration large, innovative changes across the department or major functional areas with potential for big improvements in effectiveness or efficiency.

The CIM initiative is attempting to reorient itself back to the top-down process originally recognized as important.

It Has Been Difficult to Implement CIM Top Down

- Opening DoD to big changes can appear threatening to commands and components.
- Measures of “value-added” by processes have proved difficult or infeasible in practice.
- CIM-prompted changes give appearance of the business-information “tail” wagging the military-operations “dog.”

Despite good intentions, it has been difficult to implement CIM from a top-down orientation.

Opening DoD to big changes often appears threatening to commands and components fearing more change than they need or feel they can tolerate. Standardization of information management means reduction of redundancy, but that can entail loss of control or responsiveness from one's own system.

The CIM process includes analysis of processes and activities performed within the organization. It was thought that each process could be assessed with respect to the value it added to the total enterprise. In practice, “value-added” has been elusive, and costs of processes have often been used as proxies. That guts the concept and invalidates the conclusions—for surely the analysis is not intended to conclude that the most expensive processes necessarily add the most value.⁹

⁹P. A. Strassmann, *Information Payoff*, The Free Press, New York, 1985, p. 244.

Motivation for Considering STT as a Complement to CIM

- If “value-added” is an impractical measure and the military missions should drive the business side of DoD, then a more operationally oriented approach is called for.
- STT is an operationally oriented approach that is not inconsistent with the goals of CIM.

Because CIM is inspired by business practices, uses much of the language of information management in business (such as “enterprise,” “what is our business,” and “who are our customers”), and is largely motivated by insights from data processing, it can be perceived as failing to appreciate how the military “business” of readying for, preventing, and winning war differs, say, from producing and marketing consumer products.

If “value-added” is largely impractical and military considerations should drive business ones, there is need for an operationally oriented complement to CIM.

STT is operationally oriented, and it is not inconsistent either with CIM or with other current proposed streamlining DoD efforts.

Conclusions

CIM and STT are complementary concepts

- **Consistent with current DoD streamlining initiatives**
- **Provide a common discipline for resource decisionmaking**
- **Define continuous thread concept of operations (i.e., national security strategy to budget)**

CIM and STT strengthen the fiscally constrained planning function

- **Link warfighting requirements to support issues**
- **Link operational considerations to “good business practices”**
- **Replicable**

7. CONCLUSIONS AND RECOMMENDATIONS

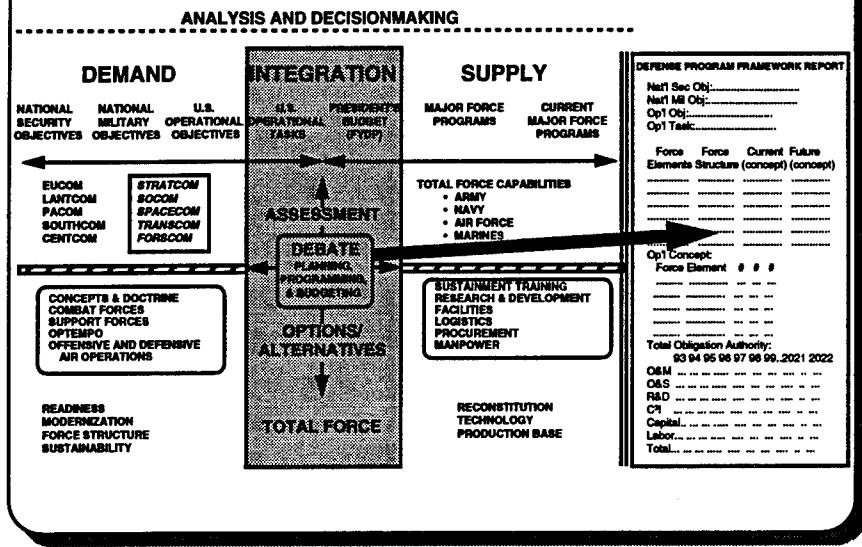
Our conclusions are that STT and CIM concepts are, indeed, complementary, and that both are consistent with current DoD streamlining initiatives. They can provide needed discipline for resource decisionmaking by defining continuous (unbroken) thread relationships from national security strategy to budgeted resources.

STT strengthens the fiscally constrained planning function, long said to be the silent “P” (for “planning”) in the PPBS. It provides the crosswalk from the planning to the programming function. CIM strengthens the transition from the programming to the budgeting phases. It enables resource planners to decide how all resources can be budgeted and evaluated. Both STT and CIM give planners needed tools to link operational (wafighting) requirements to support issues, to link operational military considerations to good business practices, and to make analysis behind resource trade-offs replicable.

In summary, we do not see STT and CIM as either inconsistent or in competition with one another. We believe that both can be applied, jointly or separately, to good effect at the CINC level.

We believe that the net result of using STT and CIM can be a strengthening of the PPBS process, and ultimately resource decisionmaking and management.

An “Operationally Based” PPBS



We have already mentioned the need for an operationally based PPBS, with an enhanced integration function, to improve the linkages between higher-level considerations (national security objectives, national military objectives, and operational objectives), operational objectives at the regional and theater levels, and the major force programs.

The headings will now be recognized as the STT taxonomy. Thus, STT facilitates the integration of the operational demand and supply. CIM provides the crosswalk from the operational needs to their clear articulation in the defense program.

The programmatic debate necessary for decisionmaking would use the STT and CIM framework.

Recommendations

- Define how to implement total CIM concept in pieces as environment shifts.
- Utilize DoD Enterprise Model as template to address questions that will emerge:
 - Less “threatening” to current environment.
- Link CIM/STT to FYDP.
- Assess how FYDP might be modified to link all DoD functions to costs:
 - This is the key to implementation of the total concept.

These are our recommendations. Although in an ideal world CIM would be implemented across the board, starting with the highest level in DoD, we do not expect to see that happen in practice. Despite that assumption, we do not see starting at the bottom, with databases and data systems, as desirable, either. Rather, we suggest applying CIM at the CINC or major command level, as high up in the CIM process as the organizational environment allows. We also recommend taking advantage of opportunities as the organizational environment shifts.

We recommend using the DoD Enterprise Model as a template in addressing questions that will emerge in applying CIM to any organization. This should be done in a manner that is not perceived to be threatening, e.g., by appearing to force one's organization into some DoD-standard mold or by taking control (and responsiveness) of information systems away from local commands.

There is also considerable potential in linking CIM/STT to PPBS in developing the FYDP. We recommend assessment of how the FYDP might be modified to link all DoD functions to costs, which we see as the key to implementation of the total concept.

GLOSSARY

CFC	Combined Forces Command (U.S. and ROK)
CIM	Corporate Information Management, information management that is based on enterprise-wide principles and activities, including (1) optimizing policy and business methods, (2) improving key processes and standardizing data, and (3) implementing improved systems and infrastructures to support enterprise methods, processes, and data
CIM/STT	A framework the combining CIM and Strategy-to-Tasks concepts
CINC	Commander-in-Chief
Continuous thread	The strategy-to-tasks discipline requires explicit identification of relationships from resources to forces to tasks to strategy, such that an unbroken (continuous) thread can be traced up or down the hierarchy
DoD	Department of Defense
End to end	In strategy-to-tasks, each operational task is decomposed into a network of required capabilities, embodying a complete (beginning-to-end or end-to-end) concept of operations
FYDP	Future-Year Defense Plan
ICAM	Integrated Computer-Aided Manufacturing
IDEF	ICAM Definition Languages, a set of conventions for diagramming systems of processes, inputs, outputs, controls, and means
Information	The organization of data in a form that can be used to manage and operate an enterprise
Information management	The systematic and effective management of all information needed by an enterprise
MOE	Measure of effectiveness
MOP-39	Memorandum of Policy restricting access to war plan information
OSD	Office of the Secretary of Defense
PPBS	Planning, Programming, and Budgeting System

ROK	Republic of Korea (South Korea)
SECDEF	Secretary of Defense
STRM	Strategy-to-Tasks Resource Management
STT	Strategy-to-Tasks
UNC	United Nations Command (Korea)
USFK	United States Forces, Korea
USPACOM	United States Pacific Command
USSOCOM	United States Special Operations Command